**Insulin: Friend or Foe For Physique Athletes**

Carbs are the new generation’s easy target for blame on stalled fat-loss, rapid weight gain, and is portrayed as the enemy of the body according to the media! The reasoning goes as such:

Carbohydrates, while delicious, aid in fat storage by spiking insulin levels, which provide our body fat glucose to be stored! While at the same time, carbohydrates are needed to feed and recover muscles after strenuous activity!

Thus, an issue arises:

We need carbs if we want to [build muscle and strength as quickly as possible](https://legionathletics.com/how-to-gain-weight-fast/)…but we have to pay the price with not so lovely love handles. Or at least so they say…

One of the easiest ways to invent a fad diet is to isolate some aspect of eating and hang everything else on it. For the low-carb crowd, insulin is the scariest word in the dictionary; it’s an evil hormone designed to make us fat! And the carbohydrate, we’re told, is insulin’s partner in crime. We eat delicious carbs, and BAM! A wave of insulin floods our bloodstream!

Well, like much of the nonsense pass off on us by [magazines](https://legionathletics.com/fitness-magazine/), trainers, and “[gurus](http://www.muscleforlife.com/fitness-guru/),” the “insulin makes us fat” story is nothing but an urban legend used to scare us. Simply put;

**Insulin doesn’t make you fat. Carbs don’t make you fat. Overeating does.**

**Science Talk: (Skip if not interested in the science of Insulin)**

Insulin is a hormone that shuttles nutrients from your blood to your cells. When you eat food, it gets broken down into various substances like amino acids, glucose, and fatty acids. These all make their way into your bloodstream, and are joined by insulin, which is produced by the pancreas. As the nutrients make their way into cells, your body gradually reduces insulin levels until everything is absorbed. Insulin then remains at a low, baseline level. This cycle occurs every time you eat food, and thus your body’s insulin levels are constantly rising and falling throughout the day. Now, when explained like that, insulin sounds like a blessing! [We can’t live without it](https://www.nlm.nih.gov/medlineplus/ency/article/000305.htm). Why, then, are we told it makes us fat and sick? Well, because one of its roles in the body relates to fat storage, and that makes it an easy target.

Specifically, insulin [inhibits the breakdown of fat cells](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1083868/) and stimulates the creation of body fat. That is, it tells the body to…

1. **Stop burning fat and burn the energy readily available from the food you ate instead.**
2. **Store a portion of the energy that’s available as body fat.**

And yes, that sounds bad, which is why it’s an easy target and scapegoat. The “logic” goes like this:

*High-carb diet = high insulin levels = burn less fat and store more = get fatter and fatter*

*Low-carb diet = low insulin levels = burn more fat and store less = stay lean*

This sounds reasonable but is deeply flawed, mainly because it violates the principles of [energy balance](http://www.nhlbi.nih.gov/health/educational/wecan/healthy-weight-basics/balance.htm). Energy balance is the relationship between how much energy you eat and how much you burn. This relationship determines weight change over time and takes precedence over anything related to insulin or any other hormones. Simply put, you can’t gain a significant amount of fat without providing your body with a surplus of energy to store as fat. The takeaway is simple: if there’s an adequate calorie deficit, [carbohydrate intake](http://www.muscleforlife.com/how-many-carbs/) and insulin levels have little bearing on fat loss.

As we just learned, insulin is produced and secreted by the pancreas, which is a small gland located behind the stomach. Insulin is a hormone made by the pancreas that allows your body to use sugar (glucose) from carbohydrates in the food that you eat for energy or to store it as glycogen for future use. A simple way to think about insulin is to think of it as a key; it unlocks the body’s cells so that glucose (blood sugar) can get inside and be used for energy.

When you eat carbohydrates, they are broken down into small sugar molecules in your stomach. They then travel through your digestive system and get converted to immediately usable glucose for your muscles and brain via ATP synthesis. Any amount not used gets then converted into glycogen by the liver for storage. Beta cells in the pancreas signal to release insulin, which then binds to the body’s cells and allows them to absorb the glucose which has been converted to glycogen by the liver. If you have more glycogen then you need, insulin helps store the glycogen in your liver for later use. If you have too much glycogen in the liver, then the glycogen will be converted to triglycerides and stored in fat cells, which we don’t want.

Your skeletal muscles store about 400 grams or glycogen, the liver stores 90 to 110 grams of glycogen and your blood circulates roughly 25 grams as glucose. This means your body is capable of storing about **2,000 calories** of carbohydrates.

Insulin isn’t selective though, with each meal we are always going to store some body fat for energy, the trick is remaining insulin sensitive so you store maybe only 5-8% of the intake as fat energy and 95% as glycogen for muscle tissue and immediate energy use, but if you eat too many carbs beyond the thresholds stated above or have poor insulin sensitivity this ratio can change fast.

**So what does it mean to be insulin sensitive?**

We’ve covered insulin resistance and have an understanding of it and why it’s not desired. We now know that with every meal you are storing some body-fat, that’s how our body is built to survive. So we can think of an insulin sensitive person as having improved nutrient partitioning. A normal healthy person is going to use around 85% of their carbs for brain function, stored in the muscle, liver and some circulating in the bloodstream with about 15% being converted to triglycerides and stored as body fat for energy. But as physique athletes, what if we can alter these percentages and improve the nutrient partitioning? We know we can through training because it improves GLUT 4 translocation which increases skeletal muscle’s ability to store carbohydrates, but what else can be done to skew those numbers? Wouldn’t 95%/5% be awesome or even 98%/2%?!

**Optimizing Nutrient Partitioning:**

Carbohydrate timing can be a great tool for both dieting down or growing as it can increase and preserve insulin sensitivity. Let’s look at specific times in the day and cover what type of foods are best!

**BREAKFAST**: After a 12 hour fast, insulin sensitivity is improved thus a great time to work carbohydrates into your daily program.

**INTRA WORKOUT:** Another study that tested two groups; one that ingested carbs during their workout and the other group that did not, showed that the carbohydrate-ingested group lost the same amount of body-fat as the non-carbohydrate group, but also had positive muscular training adaptations.

**POST WORKOUT**: In a recent scientific study, it was shown that when cyclists were provided 25 grams of carbohydrates post-exercise to one group immediately afterwards and 2 hours later to another group, the group who was given the carbohydrates immediately stored them at a 45% faster rate compared to that group given them 2 hours later. This suggests that delaying carb intake post exercise will result in less muscle glycogen storage.

**CARBS AT NIGHT**: Further more scientists found that those eating a lower glycemic carbohydrate meal that is high in fiber as their last meal of the evening had a better glucose tolerance to their breakfast meal.

**Sample day to maximize nutrient partitioning:**

* Meal 1: low-glycemic carbohydrates or can skip carbohydrates and have them on meal 2 to extend the carb fasted state
* Meal 2: low-glycemic carbs here
* Pre workout: low-glycemic carbs here if eating 1-3 hours away from workout
* Intra carbs: Can add as science shows it doesn’t blunt fat loss compared to training fasted.
* Post workout carbs. Highly recommended and we know GLUT 4 translocation is increased post-training, so great time to ingest your carbs High glycemic carbs to help give a strong insulin spike!
* Meal 5: low/moderate glycemic carbs
* Meal 6: low glycemic carbs

**Supplements that help improve insulin sensitivity: Glucose Disposal Agents (GDA’s)**

What are they? GDA’s, or glucose disposal agents are supplements ingested orally that help make the body more sensitive to its OWN insulin. Below are a list of 3 key ingredients in GDA’s that allow for optimized nutrient partitioning.

* Berberine: Considered the king of over the counter GDA’s. Berberine is, based on recent studies, to be as effective as the diabetic drug metformin. Both activate AMP-activated protein kinase (AMPK) (A major regulator in cellular energy metabolism) and increase GLUT 4 translocation to the cells. A recommended dosage would be 500mg with carb meals per day, but up to 2000mg daily.
* NA R ALA: This is another GDA that activates AMPK, increasing cellular metabolism (without exercising) and it also reduces triglyceride storage in the muscle cell, which leads to insulin resistance. A recommended dosage would be100-200mg per carbohydrate containing meal.
* Vanadyl Sulfate: One study has shown that when a daily dose of 100mg was administered to humans with non-insulin dependent diabetics, after 3 weeks there was significant improvement in hepatic and peripheral insulin sensitivity. A recommended dosage would be 10-20mg per carbohydrate containing meals, but no higher than 40-80mg per day as it’s a metal.

With all GDA’s, I recommend using them with any carbohydrate based meal that you ingest and to consume them 15-20 minutes prior to eating if possible.

Note: The body is excellent at nutrition partitioning after exercise as we mentioned with increased GLUT 4 activity, but depending on the quantity of ingested carbohydrates, taking a GDA shortly after could provide benefit? Why? This will allow your insulin to spike high (which is what we want after a workout), and then by taking a GDAs AFTER eating, you could more efficiently store any remaining blood sugars after the spike.

Note: For super hard gainers who consistently eat extreme amounts of carbohydrates, GDAs AFTER every meal could be very useful to protect insulin sensitivity. This preserves the muscle cells sensitivity for long bouts of time, but also gives them in theory higher insulin spikes since they aren’t taking them pre meal.

So there we have it; is insulin really a foe? Or is it simply a tool that we need to learn how to use to optimally provide value to our goals? If you ask me, I will continue to capitalize on insulin to my benefit, but am smart with my nutrient timing and utilize supplements like GDA’s to help me partition nutrients efficiently when needed.